

CLAIMS:

1. A lithographic method to form groove-form patterns on a sample surface comprising the steps of:

causing a tip end of a probe needle to contact a surface of a sample either continuously or intermittently, said probe needle being an ultra-fine probe needle with a nano-size tip end diameter,

applying a voltage across said probe needle and sample, and

causing said probe needle to move while removing a substance that makes said sample at a probe needle contact area by an application of said voltage.

2. The lithographic method according to Claim 1, wherein said ultra-fine probe needle is a nanotube probe that is formed by fastening a base end portion of a nanotube to a holder with a tip end portion of said nanotube being caused to protrude from said holder.

3. The lithographic method according to Claim 2, wherein said holder is a pyramid portion of a cantilever for AFM use.

4. The lithographic method according to Claim 1 or 2, wherein said sample is a lithographable matter including an organic film, other organic matter and an inorganic matter, and a voltage is applied across said probe needle and said organic film so that said probe needle is used as a cathode.

5. The lithographic method according to Claim 1 or 2, wherein a groove width of and a groove depth of said groove of said groove-form pattern are controlled by adjusting a scanning speed of said probe needle and an applied voltage.

6. The lithographic method according to Claim 4, wherein said organic film is one selected from the group consisting of an electrical or optical functional film, a mask-forming film and a resist film formed on a substrate.

7. The lithographic method according to Claim 4, wherein said organic film is a polysilane film.